Inventor Search in NPL Medical Files

16/5/1 (Item 1 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

11674793 99110031 PMID: 9894740
Magnetic resonance imaging of knee cartilage **repair.**
Gold G E; Bergman A G; Pauly J M; **Lang P** ; Butts R K; Beaulieu C F; Hargreaves B; Frank L; Boutin R D; Macovski A; Resnick D
Topics in magnetic resonance imaging - TMRI (UNITED STATES) Dec 1998, 9 (6) p377-92, ISSN 0899-3459 Journal Code: 8913523
Contract/Grant No.: 5T32 CA09695-01; CA; NCI

Cartilage injury resulting in osteoarthritis is a frequent cause of disability in young people. Osteoarthritis, based on either **cartilage** injury or degeneration, is a leading cause of disability in the United States. Over the last several decades, much progress has been made in understanding **cartilage** injury and repair. Magnetic resonance (MR) imaging, with its unique ability to noninvasively image and characterize soft tissue, has shown promise in assessment of **cartilage** integrity. In addition to standard MR imaging methods, MR imaging contrast mechanisms under development may reveal detailed information regarding the physiology and morphology of **cartilage** . MR imaging will play a crucial role in assessing the success or failure of therapies for **cartilage** injury and degeneration. (46 Refs.)

16/5/2 (Item 2 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

10450447 96257170 PMID: 8657921
Indirect MR arthrography: optimization and clinical applications.
Vahlensieck M; Peterfy C G; Wischer T; Sommer T; **Lang P** ; Schlippert U; Genant H K; Schild H H
Radiology (UNITED STATES) Jul 1996, 200 (1) p249-54, ISSN 0033-8419 Journal Code: 0401260

PURPOSE: To evaluate and optimize a method for producing magnetic resonance (MR) images similar to MR arthrograms of multiple synovial joints with intravenous gadopentetate dimeglumine injection. MATERIALS AND METHODS: The authors examined the effects of joint motion, dose of gadopentetate dimeglumine (0.1, 0.2, and 0.4 mmol/kg), and fat saturation on the enhancement rate of the joint cavity and the degree of image contrast generated among articular structures on MR images in 14 healthy volunteers. Shoulder, elbow, wrist, hip, knee, and ankle joints of 10 volunteers were imaged with optimized parameters. Indirect MR arthrographic findings in 17 patients with joint disorders (eg, rotator-cuff tears, meniscal tears, and osteoarthritis) were compared with arthroscopic findings. RESULTS: Fat-saturated images obtained after 10 minutes of exercise and administration of 0.1 mmol/kg gadopentetate dimeglumine were similar to those obtained after intraarticular injection of contrast medium. Exercising the joint yielded the strongest joint-cavity enhancement. Increasing the dose of contrast medium in the unexercised joint did not statistically significantly improve the contrast-to-noise ratio. Rotator cuff tears, meniscal tears, and **cartilage** defects were better delineated with this method than with unenhanced MR imaging and showed good correlation with arthroscopic results. CONCLUSION: Indirect MR arthrography of an exercised joint provides homogeneous enhancement and improved delineation of soft-tissue structures.

16/5/3 (Item 3 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

08655258 95343852 PMID: 7618560
Quantification of the volume of articular cartilage **in the metacarpophalangeal joints of the hand: accuracy and precision of three-dimensional MR imaging.**
Peterfy C G; van Dijke C F; Lu Y; Nguyen A; Connick T J; Kneeland J B; Tirman P F; **Lang P** ; Dent S; Genant H K
AJR. American journal of roentgenology (UNITED STATES) Aug 1995, 165 (2) p371-5, ISSN 0361-803X Journal Code: 7708173
OBJECTIVE. **Cartilage** loss is central to the development of joint failure in arthritis. However, radiographic assessment of **cartilage** loss is highly unreliable. This study examined the accuracy and reproducibility of a noninvasive technique for quantifying the volume of articular **cartilage** in the metacarpophalangeal joints of the hand by use of three-dimensional (3D) MR imaging. SUBJECTS AND METHODS. Eight metacarpophalangeal joints (four normal, one rheumatoid arthritic, and three normal cadaveric) each were imaged three times with a 1.5-T clinical MR imaging scanner with a small partial volume coil and a fat-saturated 3D spoiled gradient-echo sequence optimized for delineating articular **cartilage** . The volumes of **cartilage** over the metacarpal and phalangeal surfaces were quantified by summing the voxels within segmented 3D reconstructions of the images. **Cartilage** volumes in the three cadaver joints also were estimated by scraping **cartilage** off the articular surfaces and measuring water displacement in graduated cylinders. These values were used as the gold standard for assessing the accuracy of **cartilage** volume quantification by MR imaging. RESULTS. The fat-saturated sequence discriminated the articular **cartilage** from adjacent joint structures with high contrast and high spatial resolution. **Cartilage** volumes determined by MR imaging for the different subjects ranged from 115 microliters to 222 microliters for metacarpal **cartilage** and from 34 microliters to 86 microliters for proximal phalangeal **cartilage** . Accuracy errors for quantifying **cartilage** volume by MR imaging were -1.8% (95% confidence interval, -3.5% to -0.7%) for metacarpal **cartilage** and 9.1% (4.3% to 14.7%) for proximal phalangeal **cartilage** . Reproducibility errors were 5.2% (95% confidence interval, 2.9% to 7.6%) and 9.9% (5.4% to 15.1%), respectively. CONCLUSION. Fat-suppressed T1-weighted 3D MR imaging provides sufficient contrast and spatial resolution to allow accurate and reproducible quantification of articular **cartilage** volume in the metacarpophalangeal joints of the hand. This technique may be useful for monitoring **cartilage** loss in patients with arthritis.

16/5/4 (Item 4 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

08236284 94302241 PMID: 8029420
Quantification of articular cartilage **in the knee with pulsed saturation transfer subtraction and fat-suppressed MR imaging: optimization and validation.**
Peterfy C G; van Dijke C F; Janzen D L; Gluer C C; Namba R; Majumdar S; **Lang P** ; Genant H K

Radiology (UNITED STATES) Aug 1994, 192 (2) p485-91, ISSN 0033-8419 Journal Code: 0401260

PURPOSE: To assess the reproducibility and accuracy of volumetric quantifications of articular **cartilage** in the knee determined with three-dimensional (3D) magnetic resonance (MR) imaging combined with pulsed saturation transfer subtraction (STS) or T1-weighted fat suppression (FS) imaging. MATERIALS AND METHODS: Eight osteoarthritic knees were imaged repeatedly with optimized STS and FS sequences. **Cartilage** volumes were determined from 3D reconstructions of FS and STS images and by means of water displacement of surgically retrieved tissue. RESULTS: Mean over- or underestimation of **cartilage** volume at STS and FS imaging was 0.40 mL +/- 0.11 (standard deviation) (8.2%) and 0.31 mL +/- 0.08 (5.9%), respectively. Intraobserver reproducibility error was 0.20-0.65 mL (3.6%-6.4%) for STS and 0.21-0.58 mL (4.2%-6.4%) for FS imaging. Interobserver error was less than 0.62 mL and 7.8%. CONCLUSION: Three-dimensional data analysis of MR images acquired with STS or FS allows accurate and reproducible volumetric quantification of articular **cartilage** in the knee.

16/5/5 (Item 5 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

08201716 94267639 PMID: 8207584

Chondrocyte cells respond mechanically to compressive loads.

Freeman P M; Natarajan R N; Kimura J H; **Andriacchi T P**

Journal of orthopaedic research - official publication of the Orthopaedic Research Society (UNITED STATES) May 1994, 12 (3) p311-20, ISSN 0736-0266 Journal Code: 8404726

Contract/Grant No.: AR-39239; AR; NIAMS

Many studies have illustrated the effect of mechanical loading on articular **cartilage** and the corresponding changes in chondrocyte metabolism, yet the mechanism through which the cells respond to loading still is unclear. The purpose of this study was to evaluate the change in shape of chondrocytes under a statically applied uniaxial compressive load. Isolated chondrocytes from rat chondrosarcoma were embedded in 2% agarose gel. Strains of 5, 10, and 15% were applied, and images of the cell were recorded from initial loading to equilibrium (15 minutes). A finite-element model was used to model the experimental setup and to estimate the mechanical properties of the chondrocyte at equilibrium. The transient behavior of the composite in the experiment was analyzed with use of a standard linear viscoelastic model. We found that all cells decreased in cross-sectional area under each of the applied compressive strains. In the finite-element model, the elasticity of the chondrocyte was similar to that of the surrounding agarose gel (4.0 kPa) and had a Poisson's ratio of 0.4. Viscoelastic analysis showed that the chondrocytes contributed a significant viscoelastic component to the behavior of the composite in comparison with the agarose gel alone. If a decrease in cell volume proportional to the decrease in cross-sectional area is assumed, the decrease observed was greater than would be predicted by a passive cellular response due to an equivalent osmotic pressure. This indicates that the chondrocyte may be altering its intracellular composition by cellular processes in response to mechanical loading.

16/5/6 (Item 6 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

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08138344 94204213 PMID: 8153315

MR imaging of the arthritic knee: improved discrimination of cartilage **, synovium, and effusion with pulsed saturation transfer and fat-suppressed T1-weighted sequences.**

Peterfy C G; Majumdar S; **Lang P** ; van Dijke C F; Sack K; Genant H K

Radiology (UNITED STATES) May 1994, 191 (2) p413-9, ISSN 0033-8419 Journal Code: 0401260

PURPOSE: To assess the applicability of three-dimensional (3D) magnetic resonance (MR) imaging with pulsed saturation transfer (ST) or fat saturation in depicting articular structures in arthritic knees. MATERIALS AND METHODS: Eleven patients underwent MR imaging with T1-weighted spin-echo (SE); unenhanced and contrast material-enhanced T2*-weighted 3D gradient-echo with and without on-resonance pulsed ST; and T1-weighted, fat-presaturated 3D gradient-echo techniques. Images with ST were subtracted from those without ST. RESULTS: Both fat-suppressed imaging and ST-subtraction (STS) techniques generated a high contrast-to-noise ratio among **cartilage** , synovium, effusion, bone, and adipose tissue. Both techniques depicted hypertrophic synovial tissue on unenhanced images; contrast material was necessary to differentiate between synovium and **cartilage** on STS images. CONCLUSION: 3D MR imaging with fat-suppressed or STS techniques provides good discrimination among articular structures in arthritic knees. Fat-suppressed imaging is faster than STS imaging and offers better contrast between **cartilage** and synovium. These techniques may improve monitoring of arthritic disease progression and therapeutic response.

16/5/7 (Item 7 from file: 155)

DIALOG(R)File 155:MEDLINE(R)

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07634231 93089426 PMID: 1456365

The anterior cruciate ligament-deficient knee with varus alignment. An analysis of gait adaptations and dynamic joint loadings.

Noyes F R; Schipplein O D; **Andriacchi T P** ; Saddemi S R; Weise M

American journal of sports medicine (UNITED STATES) Nov-Dec 1992, 20 (6) p707-16, ISSN 0363-5465 Journal Code: 7609541

Contract/Grant No.: AR39421; AR; NIAMS

Thirty-two patients with an ACL-deficient knee and lower limb varus alignment and 16 healthy controls were analyzed during level walking using a force-plate and optoelectronic system. The forces and moments of the lower limb and knee joint were measured and knee joint loads and ligament tensile forces were calculated using a mathematical model. The majority of patients (20 of 32) had an abnormally high adduction moment at the affected knee. The adduction moment showed a statistically significant correlation to high medial tibiofemoral compartment loads and high lateral soft tissue forces, but not to the degree of varus alignment on standing roentgenograms. Fifteen of 32 knees had abnormally high lateral soft tissue forces. We interpreted these gait findings as indicative of a medial shift in the center of maximal joint pressure and an increase in lateral soft tissue forces to achieve coronal plane stability. Further, there is the likelihood of separation of the lateral tibiofemoral joint and "condylar lift-off" during periods of the stance phase. If this occurs, all of the load-bearing forces would shift to the medial tibiofemoral joint and relatively large tensile forces would occur in the lateral soft tissue

restraints. The flexion moment, as related to the quadriceps muscle force, was significantly lower than the control knees in 40% of the involved knees, and the extension moment, as related to the hamstring muscle force, was significantly higher in 50% of the involved knees. We interpret this finding as a gait adaptation tending to diminish quadriceps muscle activity and enhance hamstring muscle activity to provide dynamic anteroposterior stability of the knee joint. The fundamental assumption of this paper is that any combination of conditions leading to higher medial joint forces is associated with factors leading to more rapid degeneration of the medial compartment in patients with ACL deficiency, varus deformity, and lax lateral ligaments.

16/5/8 (Item 8 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

07241206 92103835 PMID: 1728999
Imaging of the hip joint. Computed tomography versus magnetic resonance imaging.
Lang P ; Genant H K; Jergesen H E; Murray W R Genant H K U CA, San Francisco
Clinical orthopaedics and related research (UNITED STATES) Jan 1992, (274) p135-53, ISSN 0009-921X Journal Code: 0075674
The authors reviewed the applications and limitations of computed tomography (CT) and magnetic resonance (MR) imaging in the assessment of the most common hip disorders. Magnetic resonance imaging is the most sensitive technique in detecting osteonecrosis of the femoral head. Magnetic resonance reflects the histologic changes associated with osteonecrosis very well, which may ultimately help to improve staging. Computed tomography can more accurately identify subchondral fractures than MR imaging and thus remains important for staging. In congenital dysplasia of the hip, the position of the nonossified femoral head in children less than six months of age can only be inferred by indirect signs on CT. Magnetic resonance imaging demonstrates the **cartilaginous** femoral head directly without ionizing radiation. Computed tomography remains the imaging modality of choice for evaluating fractures of the hip joint. In some patients, MR imaging demonstrates the fracture even when it is not apparent on radiography. In neoplasm, CT provides better assessment of calcification, ossification, and periosteal reaction than MR imaging. Magnetic resonance imaging, however, represents the most accurate imaging modality for evaluating intramedullary and soft-tissue extent of the tumor and identifying involvement of neurovascular bundles. Magnetic resonance imaging can also be used to monitor response to chemotherapy. In osteoarthrosis and rheumatoid arthritis of the hip, both CT and MR provide more detailed assessment of the severity of disease than conventional radiography because of their tomographic nature. Magnetic resonance imaging is unique in evaluating **cartilage** degeneration and loss, and in demonstrating soft-tissue alterations such as inflammatory synovial proliferation. (58 Refs.)

16/5/9 (Item 9 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

07127514 91368678 PMID: 1892040 Record Identifier: 91368678

Osteoarthritis of the knee: comparison of radiography, CT, and MR imaging to assess extent and severity.

Chan W P; **Lang P** ; Stevens M P; Sack K; Majumdar S; Stoller D W; Basch C ; Genant H K

AJR. American journal of roentgenology (UNITED STATES) Oct 1991, 157 (4) p799-806, ISSN 0361-803X Journal Code: 7708173

Although conventional radiography is the method most frequently used for monitoring progression of osteoarthritis, it may not show osteoarthritic changes of the knee until late in the disease, and it may show involvement of only one or two compartments in patients who have tricompartmental disease. We compared radiography, CT, and MR imaging for assessing the extent and severity of osteoarthritis of the knee in 20 patients. Radiography included posteroanterior weight-bearing, true lateral, and sunrise patellar projections. Axial CT scans were reformatted in sagittal and coronal planes. MR imaging consisted of spin-echo (600-800/20; 2000/60, 120 [TR/TE]), and gradient-echo (600/30, theta = 30 degrees) sequences. The severity of osteoarthritic changes was graded from 0 to 3. MR frequently showed tricompartmental **cartilage** loss when radiography and CT showed only bicompartmental involvement in the medial and patellofemoral compartments. In the lateral compartment, MR showed a higher prevalence of **cartilage** loss (60%) than radiography (35%) and CT (25%) did. In the medial compartment, CT and MR showed osteophytes in 100% of the knees, whereas radiography showed osteophytes in only 60%. Notably, radiography often failed to show osteophytes in the posterior medial femoral condyle. On MR images, meniscal degeneration or tears were found in all 20 knees studied. Partial and complete tears of the anterior cruciate ligament were found in three and seven patients, respectively. MR is more sensitive than radiography and CT for assessing the extent and severity of osteoarthritic changes and frequently shows tricompartmental disease in patients in whom radiography and CT show only bicompartmental involvement. MR imaging is unique for evaluating meniscal and ligamentous disease related to osteoarthritis.

16/5/10 (Item 10 from file: 155)

DIALOG(R)File 155:MEDLINE(R)

06384880 90009273 PMID: 2794026 Record Identifier: 90009273

Three-dimensional digital displays in congenital dislocation of the hip: preliminary experience.

Lang P ; Genant H K; Steiger P; Lindquist T; Moore S; Skinner S R

Department of Radiology, University of California, San Francisco 94143.

Journal of pediatric orthopedics (UNITED STATES) Sep-Oct 1989, 9 (5) p532-7, ISSN 0271-6798 Journal Code: 8109053

Four patients with congenital dislocation of the hip (CDH) were studied on a research basis with three-dimensional computed tomography (3-D CT) or, alternatively, with three-dimensional magnetic resonance imaging (3-D MR). 3-D CT and 3-D MR proved useful in demonstrating the extent of anterior and posterior acetabular coverage. 3-D CT was limited to patients greater than 6 months of age with ossified femoral heads. 3-D MR, in contrast to 3-D CT, demonstrated the **cartilaginous** femoral head in children less than 6 months of age, while avoiding gonadal irradiation. Both 3-D CT and 3-D MR appear promising in confirming the diagnosis and facilitating the choice of treatment modality in the child with complicated CDH.

16/5/11 (Item 11 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

05859791 88213819 PMID: 3366962 Record Identifier: 88213819
Three-dimensional CT and MR imaging in congenital dislocation of the hip: clinical and technical considerations.
Lang P ; Steiger P; Genant H K; Chafetz N; Lindquist T; Skinner S; Moore S
Journal of computer assisted tomography (UNITED STATES) May-Jun 1988, 12 (3) p459-64, ISSN 0363-8715 Journal Code: 7703942
Three-dimensional (3D) CT and 3D magnetic resonance (MR) imaging were performed in four patients with congenital dysplasia of the hip. Two patients were studied by 3D CT and two by 3D MR. Prior to volume segmentation, two-dimensional (2D) MR image preprocessing was used to correct for nonuniform signal intensity distribution from local variations in field strength and coil response. An unsharp mask of the original MR scan was computed by extreme blurring of the image to suppress the details of the object. The unsharp mask was divided into the image on a pixel-by-pixel basis. For improved object contrast first and second echo images were combined in a 1:2 ratio. To add an additional feature for volume segmentation, 2D MR image homogeneity was computed based on 3 X 3 pixel neighborhoods. Volume segmentation was performed using one feature for CT, i.e., attenuation range, and two features for MR, i.e., signal intensity and image homogeneity range. Three dimensional CT and 3D MR demonstrated the 3D relationships of femoral heads and acetabula. Three-dimensional CT was limited to patients who had ossified femoral heads, whereas 3D MR demonstrated the **cartilaginous** femoral head. The extent of acetabular coverage on which the mode of therapy is based was shown. Three-dimensional MR permitted imaging without gonadal irradiation. The 2D MR image preprocessing described here should provide even better results in objects with greater contrast, i.e., nonosseus structures, and those of larger size with relation to image degradation from partial volume effect.

16/5/12 (Item 1 from file: 73)
DIALOG(R)File 73:EMBASE

00421197 EMBASE No: 1975193602
A model for studies of mechanical interactions between the human spine and rib cage
Andriacchi T. ; Schultz A.; Belytschko T.; Galante J.
Journal of Biomechanics (J. BIOMECH.) 1974, 7/6 (497-507)
CODEN: JBMCB
DOCUMENT TYPE: Journal
LANGUAGE: ENGLISH

A three dimensional mathematical model useful for studies of the mechanics of the human skeletal thorax is described. To construct this model, rib cage elements are incorporated into a previously reported model of the thoracolumbar spine. The vertebrae and bony portions of the ribs and sternum are idealized as rigid bodies. The behavior of the discs, ligaments and costal **cartilages** are modelled by deformable elements. Appropriate geometric and stiffness property data are assigned to the elements of the model. In constructing the model, it was found that the mechanical response

of the costo vertebral joint is strongly influenced by articulation geometry. Although rigid bodies were used to model calcified portions of the ribs, the model predicted rib cage deformations in close agreement with those measured experimentally. These studies indicate that the rigid body motion of calcified portions of the rib makes a major contribution to the deformation of the rib cage in response to certain types of loadings. Quantitative results are also reported on the roles the rib cage plays in bending responses of the spine, the lateral stability of the spine, and the production and correction of several scoliotic deformities.

16/5/13 (Item 1 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

07861266 BIOSIS NO.: 000092120632
OSTEOARTHRITIS OF THE KNEE COMPARISON OF RADIOGRAPHY CT AND MR IMAGING TO ASSES EXTENT AND SEVERITY
AUTHOR: CHAN W P; **LANG P** ; STEVENS M P; SACK K; MAJUMDAR S; STOLLER D W; BASCH C; GENANT H K
JOURNAL: AJR (AM J ROENTGENOL) 157 (4). 1991. 799-806. 1991
FULL JOURNAL NAME: AJR (American Journal of Roentgenology)
CODEN: AAJRD

ABSTRACT: Although conventional radiography is the method most frequently used for monitoring progression of osteoarthritis, it may not show osteoarthritic changes of the knee until late in the disease, and it may show involvement of only one or two compartments in patients who have tricompartmental disease. We compared radiography, CT, and MR imaging for assessing the extent and severity of osteoarthritis of the knee in 20 patients. Radiography included posteroanterior weight-bearing, true lateral, and sunrise patellar projections. Axial CT scans were reformatted in sagittal and coronal planes. MR imaging consisted of spin-echo (600-800/20; 2000/60, 120 [TR/TE]), and gradient-echo (600/30, .theta. = 30.degree.) sequences. The severity of osteoarthritic changes was graded from 0 to 3. MR frequently showed tricompartmental **cartilage** loss when radiography and CT showed only bicompartmental involvement in the medial and patellofemoral compartments. In the lateral compartment, MR showed a higher prevalence of **cartilage** loss (60%) than radiography (35%) and CT (25%) did. In the medial compartment, CT and MR showed osteophytes in 100% of the knees, whereas radiography showed osteophytes in only 60%. Notably, radiography often failed to show osteophytes in the posterior medial femoral condyle. On MR images, meniscal degeneration or tears were found in all 20 knees studied. Partial and complete tears of the anterior cruciate ligament were found in three and seven patients, respectively. MR is more sensitive than radiography and CT for assessing the extent and severity of osteoarthritic changes and frequently shows tricompartmental disease in patients in whom radiography and CT show only bicompartmental involvement. MR imaging is unique for evaluating meniscal and ligamentous disease related to osteoarthritis.

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S5        279   AU='ANDRIACCHI T':AU='ANDRIACCHI THOMAS P'
S6        885   AU='LANG P':AU='LANG P G JR'
S7        190   E13:E21,E24
S8        392   E25:E27,E31:E36
S9         87   E37,E39:E46
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S11       139   AU='NAPEL S':AU='NAPEL SANDY A'
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S16        13   RD (unique items)
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